

POWER SUPPLIES

INTRODUCTION

The power supply unit, or PSU, isn't top of most people's priorities when putting together a PC. Many people settle for a low-cost, unbranded PSU, especially as these are supplied as standard with most PC cases. But if you want a powerful PC with the latest graphics card or dual-core processor, scrimping on power supply is a mistake. A quality power supply provides stable voltages at all times, as well as providing enough power for your components.

If your PSU's voltages are unstable or it can't deliver the peak power your components need, your system will become unstable and you could even damage sensitive circuits on your motherboard.

A quality PSU will also be quiet, and have more than enough connectors for all your components.

In this month's Labs we've gathered 18 power supplies with a range of rated power outputs, connectors and prices. We took our power supplies to a dedicated laboratory and pushed them to the limit using specialist equipment. The result is the definitive guide to choosing your ideal PSU.

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ELECTRIC DREAMS

A new power supply is essential if you pack your PC with the latest components, and a decent unit can even make your PC quieter. We test 18 of the current crop of PSUs to find out what's watt



Choosing a... Power Supply

Whether you need a power supply for a new PC or you're upgrading and need to supply power-hungry new components, the decision process is the same. Look at the equipment your power supply needs to work with, and turn this into a checklist of features you need. This guide will show you how.

WATT'S FIRST

All the PSUs in this review should fit a standard ATX PC case. Three are unusually deep, though, so if you like the Zalman ZM500-HP, Hiper Type M 670W or Tagan Dual Engine 700W, make sure they'll fit before you buy.

The next consideration is power, and here the specifications get more complex. A PSU takes 230V AC power from the mains and transforms it into power at the correct voltages for your PC's components. Different parts require different voltages, so a PSU is really several power supplies in one, and each supply is called a rail. All PSUs have three main rails, 3.3V, 5V and 12V, as well as the secondary -12V and 5V standby rails. A PSU's maximum wattage tells you the total power it can provide across all its rails.

Each rail has a maximum rated current, measured in amps. As $\text{amps} \times \text{volts} = \text{watts}$, each rail's amp rating multiplied by its voltage gives its maximum power. You

might expect that all the rails' powers added together would give the power supply's maximum wattage, but it's not that simple. No PSU can supply its rated maximum on every rail at once.

To make things more complicated, some PSUs have up to four 12V rails. PSUs with multiple 12V rails are useful for PCs with very powerful components, because if one component suddenly demands a rail's maximum power, the others on separate rails are not affected.

The wattage of PSU you need depends on how power-hungry your PC's components are. A dual-core processor alone can draw over 130W, and the latest graphics cards may require up to 300W. If you have a dual-core processor and a mid-range graphics card, you need a PSU with at least 500W of power. If you want two graphics cards and have more than one hard disk, you'll need around 600W, and Nvidia recommends 700W power supplies for PCs with twin GeForce 8800GTS graphics cards. Both Nvidia and AMD have certification programs for PSUs that are guaranteed to work with two cards in SLI or CrossFire configurations. We've mentioned which cards the PSUs support in each review. You can find a full list of PSUs and their supported graphics cards at www.slizone.com and <http://ati.amd.com/technology/crossfire>.

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PLUG AWAY

Each PSU rail supplies many different connectors. To avoid having to buy adaptors, make sure your PSU has enough of the right plugs for your components. The largest connector from the PSU powers your motherboard. Older motherboards use a 20-pin connector, but newer ones have a 24-pin socket. Of the 18 PSUs in the group, 15 have connectors that fit either 20 or 24-pin motherboard sockets.

Current motherboards also use an extra 4-pin connector to help power the processor, which all the PSUs in this group have. Some Intel boards now have 8-pin connectors for additional power, which are present on 14 of the PSUs here.

PSUs also have a number of four-pin Molex and SATA connectors. Molex plugs are for DVD drives, fans, some AGP graphics cards and older hard disks. Current hard disks and some of the latest DVD drives use SATA connectors. Make sure your PSU has enough of both, and bear in mind that Molex-to-SATA adaptors are readily available, but SATA-to-Molex adaptors are not.

Powerful PCI Express graphics cards may need additional six-pin power connectors. All the PSUs in the group have at least one of these plugs. The most powerful Nvidia graphics cards need two PCI Express six-pin power connectors, and you'll also need a couple if you want to run twin graphics cards. The very latest ATI graphics

cards use a six-pin and an eight-pin PCI Express connector, and Enermax's Infiniti 650W is the only supply here with the right 8-pin plug.

ENVIRONMENTAL CONSCIENCE

As PSUs get more powerful, manufacturers are trying to improve their efficiency, which is good for the environment and your electricity bill. Look for a PSU with an average efficiency of at least 80 per cent. Efficient PSUs also run cooler, so their fans can run slower, making less noise.

Most PSUs have a single 120mm fan, but some use 80mm fans. Smaller fans tend to spin faster, which can make them noisier, but as you'll see in the reviews, this isn't always true.

How we test Power supplies

There are three main elements to a PSU's performance: whether it can deliver its total rated power, how efficiently it delivers it and whether each rail delivers an accurate voltage.

For a PSU to meet Intel's ATX specification, the voltage delivered on the -12V, 5V, 12V, and 5V standby rails must be accurate to within five per cent. The voltage on the 3.3V rail must be accurate to four per cent.

Power efficiency shows what percentage of the mains power is delivered to the rails. If

a PSU is 70 per cent efficient, 30 per cent of the power consumed is wasted as heat. PSUs also draw additional current that is neither delivered to the rails nor wasted as heat. This 'reactive power' is stored in magnetic fields and returned to the mains, but your electricity meter may still charge you for it. A PSU's power factor tells you what percentage of current drawn from the mains becomes consumed power rather than reactive power; 100 per cent is the ideal. Power factor correction (PFC) is used to boost the

power factor. Our tests show that active PFC is more effective than passive PFC.

We test voltages, efficiencies and power factors with specialist equipment at FSP's lab in St Albans. We set the equipment to draw a 50 per cent, 75 per cent and 100 per cent load from each PSU, and note the efficiency and power factor at each. Our burn-in test runs each supply at 100 per cent load for 20 minutes to see if it can output its rated maximum and maintain accurate voltages.

SUMVISION Power X 500W

★
£14 inc VAT



Sumvision's Power X 500W and Casecom's ATX 500W are the cheapest PSUs in the group, and both have a claimed rated output of 500W. The Power X 500W has a 60mm fan on the bottom and an 80mm fan at the rear, so it's not as quiet as the Casecom PSU, but it still makes only a low whirr at 50 per cent load.

The Power X has a 20- or 24-pin motherboard connector, six four-pin Molex plugs and a SATA plug. There's no six-pin PCI Express connector, though, so you'll need an adaptor to fit a modern graphics card.

At 50 per cent load, the Power X's voltages were within the ATX specification. Average efficiency was the lowest in the group at 71 per cent. Once we increased the load to 75 per cent, the PSU ran for five seconds before exploding spectacularly.

The Power X is very cheap but can't even deliver 375W, let alone 500W. One to avoid.

500W POWER SUPPLY 1x 60mm bottom, 1x 80mm rear fans, 1x 12V rails, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 6x Molex, 1x floppy, 1x SATA SUPPLIER www.ebuyer.com DETAILS www.sumvision.com.cn

- ✓ Cheap
- ✗ Can't manage rated power; it exploded

CASECOM ATX 500W

★★★
£15 inc VAT



Thanks to a 120mm fan, Casecom's ATX 500W PSU is quieter than Sumvision's Power X. It made hardly any noise at 50 per cent load and was still quiet when delivering 75 per cent.

The Casecom PSU isn't over-endowed with connectors. It supports motherboards with 24-pin and 20-pin power connectors, but it has no PCI Express graphics card connector, no SATA connectors for current hard disks and only four 4-pin Molex connectors. To use a modern PCI Express graphics card and SATA hard disk, you'd need a couple of adaptors, which would take up all but one of your Molex plugs.

At 50 per cent load the PSU's rails were all within the ATX specification. However, at 75 per cent it managed just 4.62V on the 5V rail, which is outside the ATX specification, and at 100 per cent load it shut down straight away.

Casecom's ATX 500W is cheap and quiet, but it manages only 50 per cent of its claimed power output before its voltages wander.

500W POWER SUPPLY 1x 120mm bottom fan, 1x 12V rails, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 4x Molex, 1x floppy SUPPLIER www.casecom.com DETAILS www.casecom.com

- ✓ Quiet; inexpensive
- ✗ Can't manage rated power; no SATA connectors

XILENCE XP480

★★★
£37 inc VAT



Xilence's XP480 is fairly inexpensive for a PSU with a rated 480W output. It has a 120mm fan mounted on the bottom, so it's almost silent at moderate loads.

The XP480 has a 6-pin PCI Express power connector to power high-specification graphics cards. With two SATA connectors and four Molex connectors, it could power a hard disk RAID array and a couple of optical drives.

Its voltage rails were within the ATX specification at 50 and 75 per cent loads, but at 75 per cent voltages fluctuated continually. Its average power efficiency of 73 per cent was only slightly better than that of the £15 Casecom. The XP480 has passive PFC, so while its 75.8 per cent power factor is better than the Sumvision's and Casecom's, it's far behind the 95 per cent or more of the others in the group.

The XP480 couldn't manage 100 per cent load and shut down straight away. It's inexpensive and quiet, but it can't deliver its claimed wattage and its voltage is unstable.

480W POWER SUPPLY 1x 120mm bottom fan, 2x 12V rails, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 1x PCI E, 4x Molex, 1x floppy, 2x SATA SUPPLIER www.quietpc.com DETAILS www.xilence-power.com

- ✓ Quiet
- ✗ Can't manage its rated power

HIPER Type M 530W

★★★★★
£47 inc VAT



Hiper's Type M 530W is the cheapest CrossFire-certified PSU in the group. It's certified to work with twin AMD X1800, X850 and X800 cards in a CrossFire configuration, but as there's only one six-pin PCI Express connector you may have to buy an adaptor cable.

The Type M 530W has six Molex and two SATA connectors, compared with the six Molex and four SATA plugs on Antec's similarly priced Earthwatts 500W. The Hiper PSU has a 120mm fan but was fairly loud at 100 per cent load and made a buzzing sound.

The Type M's 3.3V and 5V rails were stable in the 100 per cent load burn-in test, and the 12V rails were also stable, if a little high at 12.39V. The PSU's 77.2 per cent average power efficiency is near the bottom of the group.

The Type M 530 is stable and good value, but Antec's Earthwatts has more connectors, is more efficient and costs only a little more.

530W POWER SUPPLY 1x 120mm bottom fan, 2x 12V rails, CrossFire certified, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 1x PCI E, 6x Molex, 2x floppy, 2x SATA SUPPLIER www.scan.co.uk DETAILS www.hipergroup.com

- ✓ CrossFire certified
- ✗ Not very efficient

ENERMAX Liberty 400W

★★★★★
£50 inc VAT



Enermax's Liberty 400W is the cheapest modular PSU in the group. Modular PSUs have detachable cables, so you fit only the cables you require. This makes for a tidier case.

The Liberty 400W provides cables for seven Molex and seven SATA connectors. AMD certifies it to work with twin X800, X850 and X1800 graphics cards in a CrossFire configuration, but you may need a Molex-to-6-pin PCI Express adaptor for your second card.

The Liberty 400W was quiet at 50 per cent load apart from a slight whooshing, and made a low drone at 100 per cent. It stayed cool, even after the burn-in test. The PSU was also within the ATX specification at all loads, although the 12V rail was fairly low at 100 per cent. The Liberty 400W is fairly efficient, with an average power efficiency of 80.5 per cent.

If you're building a low-spec PC and can't stand case clutter, the Liberty 400W is a good buy, but you pay extra for the modular design.

400W POWER SUPPLY 1x 120mm bottom fan, 2x 12V rails, CrossFire certified, modular, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 1x PCI E, 7x Molex, 1x floppy, 7x SATA SUPPLIER <http://uk.insight.com> DETAILS www.enermax.co.uk

- ✓ Modular; CrossFire certified
- ✗ Expensive for a 400W supply

ANTEC Earthwatts 500W

★★★★★
£53 inc VAT



BUDGET BUY
Antec's Earthwatts 500W is one of the

most efficient PSUs. Its average power efficiency across all loads is 84.7 per cent, which puts it near the top of the group. It was particularly efficient at 50 per cent load, delivering 86.5 per cent of its power to the PC.

It has enough connectors for most PCs, with six Molex plugs and four SATA connectors. There are two six-pin PCI Express connectors for twin graphics cards, but the PSU is not officially SLI or CrossFire certified.

It may have an 80mm fan rather than a 120mm one, but the PSU made no noise at 50 per cent load. There was a slight whooshing at 100 per cent, but it wasn't annoying. The PSU was still cold after the burn-in test, and was within the ATX specification at all loads.

The Earthwatts 500W costs a little more than Hiper's Type M 530W and has a slightly lower power rating, but it has more connectors and is far more efficient. It's our Budget Buy.

500W POWER SUPPLY 1x 80mm rear fan, 2x 12V rails, CONNECTORS 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 6x Molex, 1x floppy, 4x SATA SUPPLIER www.morecomputers.co.uk DETAILS www.antec.com

- ✓ Quiet; efficient; cool

FSP Blue Storm II 500W

★★★★★

£60 inc VAT

The FSP Bluestorm II's metallic blue finish would look great in a clear case.

The PSU has the same six Molex, four SATA and two PCI Express connectors as Antec's Earthwatts 500W, but there is no eight-pin 12V connector as used by some newer motherboards.

Like most of the PSUs in the group, the Bluestorm II has a 120mm fan. It's quiet – it was silent at 50 per cent load, and remained quiet at 100 per cent although the fan spun faster. It was also cool after the burn-in test. Voltages on all rails were stable at all loads, and the Bluestorm II is fairly efficient, with an average of 82.5 per cent of power drawn from the mains going to the PSU's outputs.

FSP's Bluestorm II is quiet, stable and efficient. The omission of an eight-pin 12V processor connector is strange, though, and Antec's Earthwatts 500W is a slightly cheaper and more power-efficient 500W power supply.



500W POWER SUPPLY 1x 120mm bottom fan, 2x 12V rails **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 2x PCI E, 6x Molex, 1x floppy, 4x SATA
SUPPLIER www.vadim.co.uk DETAILS www.fspgroup.co.uk
☒ Quiet; efficient
☒ Expensive

AKASA Green Power 80+ 500W

★★★★★

£62 inc VAT

The Akasa Green

Power 80+ 500W's name gives a clue to its environment-friendly efficiency. This is the most efficient PSU in the group at 50 per cent and 75 per cent loads, with astounding power efficiency figures of 86.8 per cent and 86.2 per cent.

The PSU has six Molex and four SATA connectors, and two six-pin PCI Express plugs. It is not CrossFire or SLI certified, though. The 120mm fan is fairly quiet, but it clicked and hummed slightly at 50 and 75 per cent loads.

The PSU was within the ATX specification at 50 and 75 per cent loads, but it shut down immediately when we tried to draw its rated maximum. The most we managed to get out of the PSU by gradually increasing the current on each rail was 85 per cent, or 425W.

The Green Power 80+ is stable and efficient at medium loads but can't deliver its rated maximum. Antec's Earthwatts 500W is better.



500W POWER SUPPLY 1x 120mm bottom fan, 2x 12V rails **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 6x Molex, 2x floppy, 4x SATA
SUPPLIER www.scan.co.uk DETAILS www.akasa.co.uk
☒ Efficient
☒ Can't manage rated power

CORSAIR HX520W

★★★★★

£68 inc VAT



Corsair's HX520W

is one of five

modular power supplies in the group.

The cables provide up to six Molex connectors and four SATA plugs. There are two six-pin PCI Express connectors, and the PSU is certified to work with lower-end Nvidia and AMD graphics cards in SLI and CrossFire configurations.

The HX520W is one of the quietest PSUs in the group. It was almost silent at 50 per cent and 75 per cent loads, and was still very quiet at 100 per cent. It remained quiet throughout the burn-in test, but was quite warm by the end. Voltages were stable and within the ATX specification at all loads. The PSU is also very efficient. Its overall power efficiency of 86.1 per cent puts it second in the group behind Akasa's Green Power 80+, but unlike the Akasa PSU the HX520W passed all our tests.

Corsair's HX520W is quiet, efficient and reasonably priced for a modular PSU. It's a Best Buy.



520W POWER SUPPLY 1x 120mm bottom fan, 3x 12V rails, SLI and CrossFire certified, modular **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 6x Molex, 4x SATA
SUPPLIER www.it247.com DETAILS www.corsair.com
☒ Quiet; modular; efficient; CrossFire certified

ZALMAN ZM500-HP

★★★★★

£70 inc VAT

Zalman's ZM500-HP

is a modular power supply. The bundled cables don't provide a huge variety of connectors, as there are only four Molex and four SATA plugs. It has two PCI Express connectors, but unlike Corsair's HX520W the ZM500-HP isn't SLI or CrossFire certified.

Zalman is known for its quiet products, and you can hear the ZM500-HP's fan at 50 per cent load only if you put your ear against it. Voltages are stable on all the rails at 50 and 75 per cent loads but, unlike the HX520W, the ZM500-HP has two rather than three 12V rails. The PSU is efficient, with an average power efficiency figure of 83.5 per cent at 50 and 75 per cent load. Sadly, it couldn't deliver its 500W maximum rated output, shutting down straight away when we tried.

Zalman's ZM500-HP is quiet and efficient but doesn't have many connectors and can't run at 100 per cent load. Corsair's HX520W is a better buy for a mid-range modular PSU.



500W POWER SUPPLY 1x 120mm bottom fans, 2x 12V rails, modular **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 4x Molex, 2x floppy, 2x SATA
SUPPLIER www.quietpc.com DETAILS www.zalman.co.kr
☒ Quiet; modular; efficient
☒ Can't manage rated power

HIPER Type M 670W

★★★★★

£76 inc VAT



Hiper's Type M 670W has

an unusual

design that's best

described as semi-modular. It doesn't have detachable cables, but there are no floppy connectors or SATA plugs on the main cables. Instead, the PSU comes with cables that convert the Molex plugs to floppy and SATA connectors. The adaptors all have pass-through connectors, so you won't use up all your Molex plugs. The Type M 670W is CrossFire certified for high-end AMD Radeon X1900 and X1950 graphics cards, and SLI certified for Nvidia GeForce 8800 GTS and 7950 GX2 cards.

The Type M 670W was stable at all loads and very quiet, even during the burn-in test. It stayed cool during the tests. The PSU was more efficient at higher loads, with its power efficiency rising from 82 per cent at 50 per cent load to 84.6 per cent at 100 per cent load.

The Type M 670 is powerful, efficient and surprisingly affordable for a 670W SLI- and CrossFire-certified PSU. It's a Budget Buy.



670W POWER SUPPLY 1x 80mm rear fan, 4x 12V rails, SLI and CrossFire certified **CONNECTORS** 24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 5x Molex
SUPPLIER www.ebuyer.com DETAILS www.hipergroup.com
☒ Quiet; cheap for 670W supply; CrossFire certified

COOLER MASTER Real Power Pro 550W

★★★★★

£82 inc VAT

Cooler Master's Real

Power Pro 550W has three 12V rails. In theory, this makes it more stable than a twin-rail PSU, as even if two rails are delivering their rated maximum, the third is unstressed.

Unlike most of the mid-range PSUs, the Real Power Pro 550W has more SATA than Molex connectors, with five Molex and six SATA plugs. This makes sense if you plan to build a PC with plenty of new SATA hard disks.

The Real Power Pro was quiet at 50 and 75 per cent loads, but the fan made a loud whirring noise at 100 per cent. Voltages were stable on every rail at all loads, and the PSU was the fourth most efficient in the group with an average 85.5 per cent power efficiency.

Cooler Master's Real Power Pro 550W is very efficient, but too expensive. For £14 less you can have Corsair's modular HX520W, and for £6 less the far more powerful Hiper Type M 670W.



550W POWER SUPPLY 1x 120mm bottom fan, 3x 12V rails **CONNECTORS** 24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 5x Molex, 1x floppy, 6x SATA
SUPPLIER www.overclockers.co.uk DETAILS www.coolermaster.com
☒ Efficient
☒ Fairly noisy at 100 per cent load

SEASONIC S12 Energy+ 550W

★★★★

£82 inc VAT

Seasonic's S12 Energy Plus 550W is fairly expensive for a 550W PSU, but it comes with nine Molex, six SATA and two PCI Express connectors, and is CrossFire and SLI certified for high-end AMD and mid-range Nvidia graphics cards. The connectors are spread across four 12V rails, so you can isolate your components.

The S12 550W was stable at all loads, and the voltages on its rails never strayed far from 3.3V, 5V and 12V. It's also one of the most efficient PSUs in the group: its average power efficiency figure of 85.7 per cent puts it just behind the 520W Corsair. The S12 550W wasn't quiet, however. The fan spun slowly at 50 per cent load, but made quite a whirr at 100 per cent and during the burn-in test.

Seasonic's S12 Energy Plus 550W has plenty of connectors and is stable and efficient, but it's too expensive for a 550W PSU.



550W POWER SUPPLY 1x 120mm bottom fan, 4x 12V rails, SLI and CrossFire certified **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 9x Molex, 2x floppy, 6x SATA **SUPPLIER** www.lambdata-tek.com **DETAILS** www.seasonic.com

✓ Efficient; CrossFire certified
✗ Expensive

FSP Epsilon 600W

★★★★

£82 inc VAT

FSP's Epsilon 600W and 700W both have four 12V rails, each with a maximum rated current of 18A, and a rated maximum of 36A and 30A on the 3.3V and 5V rails. However, the 600W supports an overall 580W on its 3.3V, 5V and 12V rails, compared with the Epsilon 700W's 680W.

The PSU has six Molex, six SATA and two PCI Express connectors. It's SLI certified, but not for Nvidia's latest 8800 graphics cards. AMD certifies it for use with Radeon X1900 and X1950 cards in a CrossFire configuration.

There were no voltage stability problems and the PSU was more efficient than most. The Epsilon 600W was quieter than the 700W, making only a low whirr at 100 per cent load.

FSP's Epsilon 600W is stable, fairly efficient and quiet, but Hiper's Type M 670W is cheaper, more powerful and SLI certified for the latest graphics cards.



600W POWER SUPPLY 1x 120mm bottom fan, 4x 12V rails, SLI and CrossFire certified **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 6x Molex, 2x floppy, 6x SATA **SUPPLIER** www.scan.co.uk **DETAILS** www.fspgroup.co.uk

✓ Quiet; CrossFire certified
✗ Expensive

FSP Epsilon 700W

★★★★

£99 inc VAT

The Epsilon 700W is similar to the 600W version but supports a maximum 680W overall on the 3.3V, 5V and 12V rails. It has enough connectors to power six SATA drives and six Molex devices.

The PSU's 120mm fan was fairly loud at 100 per cent load, but it did its job well, as the PSU was still cold after the burn-in test.

The Epsilon 700W had no trouble delivering its rated power output. The 12V rail was a little high at 50 per cent load but still within the ATX specification. The PSU's average power efficiency figure of 83.1 per cent puts it in the middle of the group. Unlike the 600W version, the PSU is certified by Nvidia to work with twin GeForce 8800GTS cards in an SLI configuration.

This is an efficient 700W PSU, but Tagan's Dual Engine 700W has a more flexible cable layout, and Hiper's Type M 670W has the same SLI certification and is cheaper.



700W POWER SUPPLY 1x 120mm bottom fan, 4x 12V rails, SLI and CrossFire certified **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 6x Molex, 2x floppy, 6x SATA **SUPPLIER** www.scan.co.uk **DETAILS** www.fspgroup.co.uk

✓ Efficient; CrossFire certified
✗ Fairly noisy at 100 per cent load

TAGAN Dual Engine 700W

★★★★★

£100 inc VAT



Tagan's Dual Engine 700W is

astorishingly heavy. Like

Hiper's Type M 670W it's longer than most PSUs, so check that it fits in your case.

Tagan's Dual Engine 700W has 80mm fans on the front and the rear of the PSU, but it's still fairly quiet, even at 100 per cent load.

The Dual Engine 700W has only four Molex connectors, but it has 10 SATA plugs, and Tagan includes four SATA-to-Molex adaptors. Like FSP's Epsilon 700W, the PSU is SLI certified for twin Nvidia GeForce 8800GTS graphics cards, but it doesn't have CrossFire certification. The PSU's voltages were all within the ATX specification at all loads, but power efficiency dropped below 80 per cent at 100 per cent load.

Tagan's Dual Engine 700W is less efficient than FSP's Epsilon 700W, but it has more connectors and is quieter. It's a Best Buy.



700W POWER SUPPLY 1x 80mm front, 1x 80mm rear fans, 4x 12V rails, SLI certified **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 2x PCI E, 4x Molex, 10x SATA **SUPPLIER** www.scan.co.uk **DETAILS** www.tagan.com

✓ Quiet; clever connector layout
✗ Not particularly efficient

SEASONIC M12-700

★★★★

£109 inc VAT

Seasonic's M12-700 is the most powerful modular PSU in the group. The supplied cables give you a maximum of 10 Molex connectors and eight SATA plugs, as well as four PCI Express graphics card connectors. Nvidia's GeForce 8800 GTX and 8800 Ultra cards require two connectors each, so you'd need four PCI Express connectors to run these in SLI configuration. The PSU isn't officially SLI certified for these cards, however.

The M12-700 was within the ATX specification at all loads, but the 12V rails were slightly low. This was the most efficient 700W PSU in the group, with an overall power efficiency figure of 85 per cent. It's not the quietest PSU, however. The fan was audible at 50 per cent load, and noisy at 100 per cent, but kept the PSU cool during the burn-in test.

Seasonic's M12-700 is powerful and efficient. Enermax's Infiniti 650W is quieter, but if you're after power and the flexibility of modular cables, the M12-700 is a good buy.



700W POWER SUPPLY 1x 120mm bottom fan, 4x 12V rails, SLI and CrossFire certified, modular **CONNECTORS** 20/24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 4x PCI E, 10x Molex, 8x SATA **SUPPLIER** www.kikatek.com **DETAILS** www.seasonic.com

✓ Modular; efficient; CrossFire certified
✗ Fairly noisy at 100 per cent load

ENERMAX Infiniti 650W

★★★★

£116 inc VAT

The Infiniti 650W is the most expensive PSU in the group. The bundled connectors give you a maximum of nine Molex and six SATA plugs, while there are two PCI Express modular cables. A third PCI Express connector is hard-wired to the PSU. This has a standard six-pin PCI Express connector with a couple of detachable extra pins, giving eight pins in total. AMD's new Radeon HD 2900XT requires such a connector if you want to overclock it, and this is the first PSU we've seen that is ready for this new card. It's also CrossFire and SLI certified, but only for older Nvidia 7800 and 7900 GTX cards.

The Infiniti 650W passed the ATX specification in all of our tests, and was reasonably efficient, averaging 83.4 per cent across all loads. The PSU has a huge 135mm fan, and was very quiet and cold, even at 100 per cent load and after the burn-in test.

Enermax's Infiniti 650W is expensive, but it is quiet, efficient and modular.



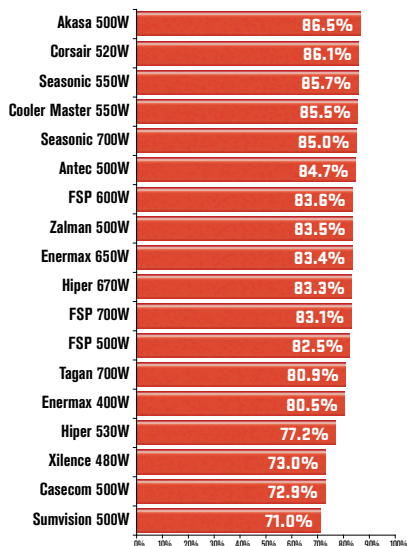
650W POWER SUPPLY 1x 135mm bottom fan, 3x 12V rails, SLI and CrossFire certified, modular **CONNECTORS** 24-pin motherboard, 1x 4-pin CPU, 1x 8-pin CPU, 3x PCI E, 9x Molex, 2x floppy, 6x SATA **SUPPLIER** www.scan.co.uk **DETAILS** www.enermax.co.uk

✓ Quiet; modular; CrossFire certified
✗ Expensive

LOAD TESTS

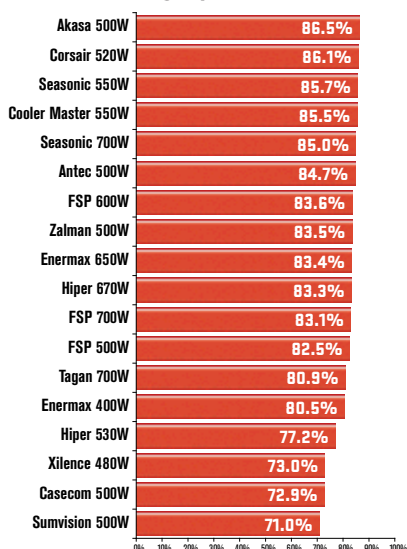
Performance Efficiency

Average efficiency



▲ A PSU's efficiency is the percentage of mains power that is delivered to your components and not wasted as heat

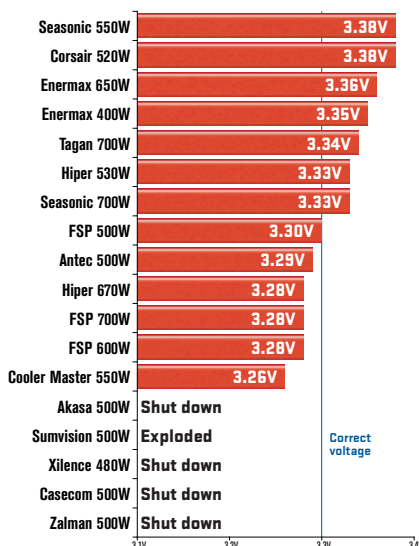
Average power factor



▲ PFC efficiency shows how much mains power is lost as reactive power rather than being consumed by the PC's components

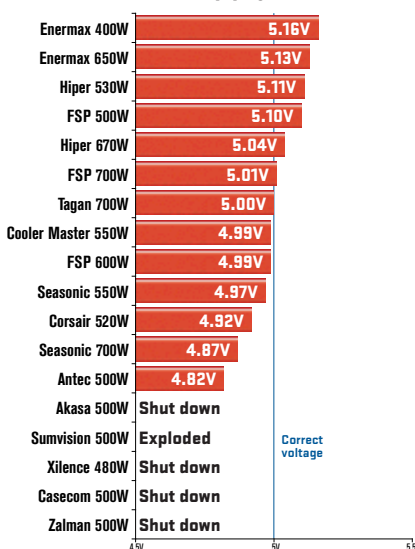
Performance Voltage accuracy

3.3V supply



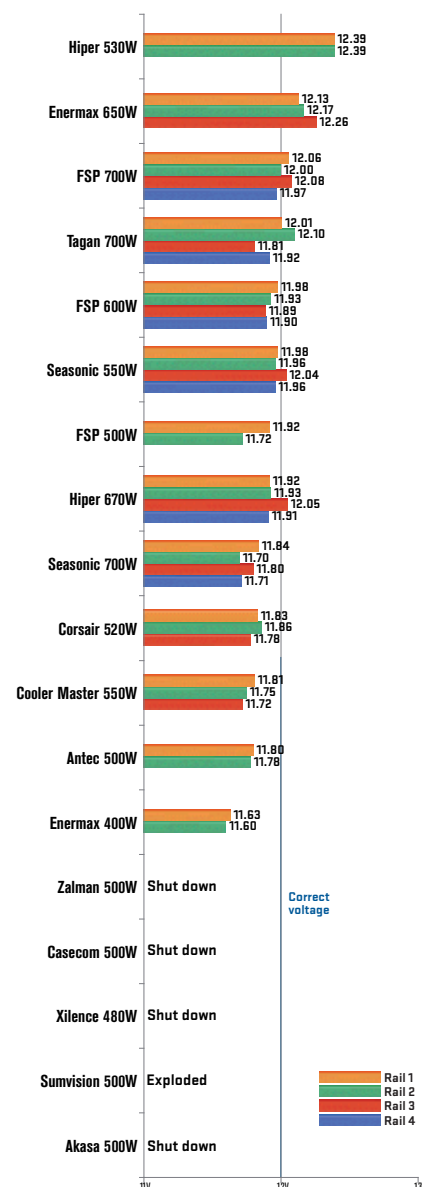
▲ The closer the power supply is to the 3.3V mark, the more stable the PSU. Five PSUs overheated or shut down at 100% load

5V supply



▲ The 5V rail supplies the motherboard, hard disks and optical drives. The rail should be no more than 5% either side of the 5V mark

12V supply



▲ Many PSUs have multiple 12V rails, so if one component suddenly needs a rail's maximum current the components on the other rails will still have enough power to function. Every rail's voltage should be as close as possible to the 12V mark

Labs verdict Power supplies

In our last power supply group test a year ago, not all the PSUs could deliver the power printed on the box. The same is true of this month's Labs. Three PSUs shut down at maximum load, while one exploded in a shower of sparks. There are still plenty of capable PSUs to choose from, however. Which one is best for you depends on your PC's requirements.

If you have a mid-range PC, Antec's Earthwatts 500W is a good buy. It's stable, efficient and good value, and wins a Budget

Buy award. If you're willing to spend a bit more, we'd recommend Corsair's HX520W for your mid-range PC. It's incredibly quiet, efficient and has the flexibility of modular cables. It's a Best Buy.

If you're building a more powerful PC and need an SLI or CrossFire-certified PSU, Hiper's Type M 670W is fairly efficient and good value. It's a Budget Buy. If you're willing to spend a bit more, the Tagan Dual Engine 700W's clever connector layout makes it a winner. It's our Best Buy high-end PSU.



POWER SUPPLIES

BUDGET BUY						BEST BUY			
MANUFACTURER	SUMVISION	CASECOM	XILENCE	HIPER	ENERMAX	ANTEC	FSP	AKASA	CORSAIR
Model	Power X 500W	ATX 500W	XP480	Type M 530W	Liberty 400W	Earthwatts 500W	Blue Storm II 500W	Green Power 80+ 500W	HX520W
Rating	★	★★	★★	★★★★	★★★★	★★★★★	★★★★	★★★	★★★★★
FEATURES									
Size (WxDxH)	149x140x85mm	149x140x85mm	150x140x84mm	149x139x86mm	149x140x86mm	149x139x85mm	149x140x86mm	149x139x86mm	149x149x86mm
Standard	ATX	ATX	ATX	ATX	ATX	ATX	ATX	ATX	ATX
PFC	None	None	Passive	Active	Active	Active	Active	Active	Active
Fans	1x 60mm bottom, 1x 80mm rear	1x 120mm bottom	1x 120mm bottom	1x 120mm bottom	1x 120mm bottom	1x 80mm rear	1x 120mm bottom	1x 120mm bottom	1x 120mm bottom
Fan control	Automatic	None	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
CLAIMED OUTPUT									
3.3V rail	25A	28A	32A	28A	26A	24A	30A	25A	24A
5V rail	40A	38A	31A	30A	28A	24A	30A	25A	24A
12V rails	16A	17A	15A + 16A	18A + 18A	20A + 20A	17A + 17A	18A + 18A	18A + 18A	18A + 18A + 18A
Maximum total output	500W	500W	480W	530W	400W	500W	500W	500W	520W
SLI certified	No	No	No	No	No	No	No	No	Yes
CrossFire certified	No	No	No	Yes	Yes	No	No	No	Yes
CONNECTIONS									
Modular	No	No	No	No	Yes	No	No	No	Yes
Molex	6	4	4	6	7	6	6	6	6
Floppy	1	1	1	2	1	1	1	2	0
SATA	1	0	2	2	7	4	4	4	4
PCI-E	0	0	1	1	1	2	2	2	2
Motherboard connector	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin
4-pin 12V processor	1	1	1	1	1	1	1	1	1
8-pin 12V processor	0	0	0	1	1	1	0	1	1
Adaptors	None	None	None	Molex to PCI-E	None	None	None	None	Molex to 2x floppy
BUYING INFORMATION									
Price inc VAT	£14 inc VAT	£15 inc VAT	£37 inc VAT	£47 inc VAT	£50 inc VAT	£53 inc VAT	£60 inc VAT	£62 inc VAT	£68 inc VAT
Supplier	www.ebuyer.com	www.ebuyer.com	www.quietpc.com	www.scan.co.uk	http://uk.insight.com	www.morecomputers.co.uk	www.vadim.co.uk	www.scan.co.uk	www.it247.com
Details	www.sumvision.com.cn	www.casecom.tw	www.xilence-power.com	www.hipergroup.com	www.enermax.co.uk	www.antec.com	www.fspgroup.co.uk	www.akasa.co.uk	www.corsair.com
Warranty	One year RTB	One year RTB	One year RTB	Three years RTB	Three years RTB	Three years RTB	One year RTB	One year RTB	Five years RTB
Part code	KY3000ATX	50012CMP4PSU	XP480	HPU-4M530-PK	ELT400AWT	EA-500	PPA5000207	AK-P050FG8 BKUKV1	CMPSU-520HXUK

BUDGET BUY						BEST BUY			
MANUFACTURER	ZALMAN	HIPER	COOLER MASTER	SEASONIC	FSP	FSP	TAGAN	SEASONIC	ENERMAX
Model	ZM500-HP	Type M 670W	Real Power Pro 550W	S12 Energy+ 550W	Epsilon 600W	Epsilon 700W	Dual Engine 700W	M12-700	Infiniti 650W
Rating	★★★	★★★★★	★★★	★★★	★★★	★★★★	★★★★★	★★★★	★★★★
FEATURES									
Size (WxDxH)	149x165x86mm	149x179x86mm	149x139x86mm	149x139x86mm	149x140x86mm	140x149x86mm	149x175x86mm	149x159x86mm	149x159x86mm
Standard	ATX	ATX	ATX	ATX	ATX	ATX	ATX	ATX	ATX
PFC	Active	Active	Active	Active	Active	Active	Active	Active	Active
Fans	1x 120mm bottom	1x 80mm rear	1x 120mm bottom	1x 120mm bottom	1x 120mm bottom	1x 120mm bottom	1x 80mm front, 1x 80mm rear	1x 120mm bottom	1x 135mm bottom
Fan control	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
CLAIMED OUTPUT									
3.3V rail	24A	25A	25A	24A	36A	36A	28A	24A	25A
5V rail	24A	30A	20A	30A	30A	30A	28A	30A	30A
12V rails	25A + 18A	16A + 16A + 16A + 16A	19A + 19A + 19A	18A + 18A + 18A + 18A	18A + 18A + 18A + 18A	18A + 18A + 18A + 18A	20A + 20A + 20A + 20A	18A + 18A + 18A + 18A	28A + 28A + 30A
Maximum total output	500W	670W	550W	550W	600W	700W	700W	700W	650W
SLI certified	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
CrossFire certified	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes
CONNECTIONS									
Modular	Yes	No	No	No	No	No	No	Yes	Yes
Molex	4	5	5	9	6	6	4	10	9
Floppy	2	0	1	2	2	2	0	0	2
SATA	2	0	6	6	6	6	10	8	6
PCI-E	2	2	2	2	2	2	2	4	3
Motherboard connector	20/24-pin	24-pin	24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	20/24-pin	24-pin
4-pin 12V processor	1	1	1	1	1	1	1	1	1
8-pin 12V processor	1	1	1	1	1	1	1	1	1
Adaptors	Molex to fan connector	Molex to 2x Molex and floppy, two Molex to 2x Molex, two Molex to Molex and 2x SATA	None	Molex to 2x floppy	None	None	Molex to 2x floppy, four SATA to Molex	Molex to 2x floppy	None
BUYING INFORMATION									
Price inc VAT	£70 inc VAT	£76 inc VAT	£82 inc VAT	£82 inc VAT	£82 inc VAT	£99 inc VAT	£100 inc VAT	£109 inc VAT	£116 inc VAT
Supplier	www.quietpc.com	www.ebuyer.com	www.overclockers.co.uk	www.lambda-tek.com	www.scan.co.uk	www.scan.co.uk	www.scan.co.uk	www.kikatek.com	www.scan.co.uk
Details	www.zalman.co.kr	www.hipergroup.com	www.cooler-master.com	www.seasonic.com	www.fspgroup.co.uk	www.fspgroup.co.uk	www.tagan.com	www.seasonic.com	www.enermax.co.uk
Warranty	Three years RTB	Three years RTB	One year RTB	Three years RTB	One year RTB	one year RTB	Three years RTB	Three years RTB	Three years RTB
Part code	ZM500-HP	HPU-4M670-SK	RS-550-ACAA-A1	SS-550HT	FX600-GLN	FX700GLN	TG700-U25	SS-700HM	EIN650AWT